

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:

Filing Date: September 27, 2001

Applicants: Henry W. Bonk et al.

Group Art Unit:

Examiner:

Title: Membranes of Polyurethane Based Materials
Including Polyester Polyols

Docket No .: 402200004DVG

Preliminary Amendment Under 37 C.F.R. § 1.115

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

Prior to examination of this application, please amend the claims.

In the Claims:

Please cancel claims 1-50 and 53-175. Amend claims 51, 52, 176, and 182.

Please see Attachment Showing Claim Amendments for a marked up version of the amended claims in which insertions are underlined and deletions are bracketed.

51. (amended) A flexible membrane, comprising:
a first layer comprising a polyurethane including a polyester polyol and
a second layer formed from a material selected from the group
consisting of co-polymers of ethylene and vinyl alcohol, polyvinylidene
chloride, co-polymers of acrylonitrile and methyl acrylate, polyethylene
terephthalate, aliphatic and aromatic polyamides, crystalline polymers,
polyurethane engineering thermoplastics, and mixtures thereof, wherein
said second layer is bonded to said first layer;
said membrane having a gas transmission rate of 15.0 or less for
nitrogen gas.

52. (amended) The membrane according to claim 51, wherein hydrogen
bonding occurs between said first and second layers.

176. (amended) A method for producing a flexible laminated membrane,
comprising the steps of:

- (a) extruding a first layer comprising polyurethane including a
polyester polyol; and
- (b) extruding a second layer of material together with said first
layer, said second layer including functional groups with hydrogen atoms
which are capable of participating in hydrogen bonding with said first layer
of polyurethane;

said membrane having a gas transmission rate of 15.0 or less for
nitrogen gas.

182. (amended) The method according to claim 176, wherein the average thickness of said first and second layers are varied over the length of the membrane.

Please add new claims 184-193.

184. (NEW) The membrane according to claim 51, wherein the polyester polyol is selected from the group consisting of the reaction products of dicarboxylic acids having up to about six carbon atoms and diols having up to about six carbon atoms.

185. (NEW) The membrane according to claim 51, wherein the polyester polyol is selected from the group consisting of the reaction products of dicarboxylic acids selected from the group consisting of adipic acid, glutaric acid, succinic acid, malonic acid, oxalic acid, and combinations thereof and diols selected from the group consisting of ethylene glycol, propanediols, butanediols, neopentyl glycol, pentanediols, hexanediols, and combinations thereof.

186. (NEW) The membrane according to claim 51, wherein the polyurethane further comprises at least one extender.

187. (NEW) The membrane according to claim 51, wherein the first layer includes up to about 70% by weight of the polyurethane.

188. (NEW) The membrane according to claim 51, wherein the first layer includes up to about 30 percent by weight of the polyurethane.

189. (NEW) The membrane according to claim 51, wherein the membrane has a gas transmission rate of 7.5 or less for nitrogen gas.

190. (NEW) The method according to claim 176, wherein the polyester polyol is selected from the group consisting of the reaction products of dicarboxylic acids having up to about six carbon atoms and diols having up to about six carbon atoms.

191. (NEW) The method according to claim 176, wherein the polyester polyol is selected from the group consisting of the reaction products of dicarboxylic acids selected from the group consisting of adipic acid, glutaric acid, succinic acid, malonic acid, oxalic acid, and combinations thereof and diols selected from the group consisting of ethylene glycol, propanediols, butanediols, neopentyl glycol, pentanediols, hexanediols, and combinations thereof.

192. (NEW) The method according to claim 176, wherein the polyurethane further comprises at least one extender.

193. (NEW) The method according to claim 176, wherein the first layer includes up to about 70% by weight of the polyurethane.

194. (NEW) The method according to claim 176, wherein the first layer includes up to about 30 percent by weight of the polyurethane.

195. (NEW) The method according to claim 176, wherein the membrane has a gas transmission rate of 7.5 or less for nitrogen gas.


REMARKS

Applicants have cancelled claims 1-50 and 53-175, amended claims 51, 52, 176, and 182, and added new claims 184-195. With these amendments, claims 51, 52, and 176-195 are presently pending.

The amendments to the claims are fully supported by the original application and claims as filed. Claim 51 has been amended to incorporate the subject matter of claim 1, from which it originally depended. Other support for the amendments may be found throughout the specification as originally filed, including on page 13, lines 17-23; on page 14, lines 16-19; on page 32, lines 11-20; on page 36, line 19, to page 37, line 4; and on page 43, lines 8-22. As is disclosed on page 43, the membrane transmission rate toward nitrogen gas may be used as a benchmark for describing its permeance.

The Examiner is invited to telephone the undersigned if it would be helpful for resolving any issue.

Respectfully submitted,



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Attachment Showing Claim Amendments

The following is a marked up version of the amended claims in which insertions are underlined and deletions are bracketed.

51. (amended) [The] A flexible membrane [according to claim 50],
comprising:

a first layer comprising a polyurethane including a polyester polyol and
[further comprising] a second layer formed from a material selected
from the group consisting of co-polymers of ethylene and vinyl alcohol,
polyvinylidene chloride, co-polymers of acrylonitrile and methyl acrylate,
polyethylene terephthalate, aliphatic and aromatic polyamides, crystalline
polymers, polyurethane engineering thermoplastics, and mixtures thereof,
wherein said second layer [which] is bonded to said first layer;

said membrane having a gas transmission rate of 15.0 or less for
nitrogen gas.

52. (amended) The membrane according to claim 51, wherein [said first
and second layers are formed together such that] hydrogen bonding occurs
between said first and second layers.

176. (amended) A method for producing a flexible laminated membrane
[useful for controlling gas permeation therethrough], comprising the steps
of:

(a) extruding a first layer [of] comprising polyurethane including a
polyester polyol; and

(b) extruding a second layer of material together with said first layer, said second layer including functional groups with hydrogen atoms which are capable of participating in hydrogen bonding with said first layer of polyurethane[to form a membrane];

said membrane [being characterized in that the resulting membrane has] having a gas transmission rate of 15.0 or less for nitrogen gas[when said membrane has an average thickness of 20.0 mils].

182. (amended) The method according to claim 176, wherein the average thickness of said first and second layers [can be] are varied over the length of the membrane.